

A SUSTAINABLE, COMMUNITY-BASED APPROACH TO CSO CONTROL

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Combined sewer systems convey both stormwater and sanitary flows and are prevalent throughout hundreds of communities, serving nearly 40 million people across the nation. During dry weather, combined sewers transport wastewater to a treatment plant. However,



A Concept Plan for Lick Run Urban Channel Corridor Near Cincinnati, OH (Image Source: Human Nature Inc.)

during rain events, large amounts of runoff entering the sewers

can cause the capacity of the system to be exceeded. When this happens, combined sewers have been designed to discharge the excess flows directly to local waterbodies. This is called a Combined Sewer Overflow (CSO). Today communities are being required by federal EPA regulations to reduce the frequency and volume of CSO discharges with the goal of improving the quality of our nation's waters. It is estimated that over \$50 billion will be spent nationwide to achieve compliance with CSO regulations.

While the federal regulations provide flexibility for permittees to develop site-specific approaches to CSO compliance, and affordability is certainly a factor in shaping the plan and schedule, CSO control



Lick Run Urban Channel Corridor from Birds Eye View (Image Source: Human Nature, Inc.)

programs generally represent a significant capital investment for affected communities. Today, more than ever, it is incumbent upon the stewards of these public expenditures to not just consider the regulatory compliance aspects of the program, but also the overall impact that this investment will have on the community.

In response to this issue, Strand Associates, Inc.® and Human Nature, Inc.® have developed an innovative approach to CSO control with the twofold objective of cost effective regulatory compliance in concert with community enhancement. Consideration is given to the unique attributes and opportunities specific to each community and even to each watershed within a community. This approach considers a broad range of information far beyond the basic data evaluated for traditional sewer projects. Specifically, the community-based approach identifies and analyzes



Lick Run Urban Channel Daylighting Feature (Image Source: Human Nature, Inc.)

the important relationships among the environment, infrastructure, the economy, natural systems, communities and neighborhoods. This holistic approach considers a wide range of possible solutions, utilizing both gray and green techniques. The objective is to identify cost effective solutions for CSO compliance that seamlessly integrate into a larger vision for the community as a whole.

A key aspect, that has made this process so successful, is the comprehensive nature of the evaluation effort. The data compilation phase includes traditional information such as existing infrastructure, soil characteristics and natural drainage, but also considers many items often overlooked, such as demographics, historical mapping, economic trends, community visions, social variables, etc. By considering this type of community specific information, the process creates a stronger foundation on which to build CSO compliant solutions.

There are many benefits of using the community-based approach for CSO control versus more traditional approaches, including:

- Resulting solutions are tailored to each specific community, and promote public and private partnerships.

- The process also helps garner political and public support for CSO control projects by engaging stakeholders early, and incorporating community visions into the planned solutions.
- The solutions emphasize the use of natural systems and sustainable infrastructure with clear environmental considerations.
- Proposed alternatives can be more cost effective than a traditional solution.
- The process delivers tangible, visible assets for the community.

Strand Associates, Inc.® and Human Nature, Inc.® continue to successfully implement this unique evaluation process for various communities throughout the Midwest. One of the more high profile examples of this process is the Lick Run Watershed in Cincinnati, OH.

Lick Run is a 2,700 acre watershed located within the Lower Mill Creek Watershed, on the west side of Greater Cincinnati in the economically challenged neighborhood of South Fairmount. The Lick Run Watershed is the location of the Metropolitan Sewer District of Greater Cincinnati's (MSDGC's) largest combined sewer overflow (CSO #5). This CSO discharges approximately 1.5 billion gallons of combined sewage annually to the Mill Creek (a direct tributary to the Ohio River), accounting for approximately 12 percent of MSDGC's total annual CSO volume. The original solution proposed for this and other CSOs in the Lower Mill Creek Watershed was a \$244-million deep tunnel to store and convey wet weather flows to the Mill Creek wastewater treatment plant.

Using this community-based approach to CSO planning, a more sustainable alternative was developed for the Lick Run Watershed. This alternative proposes the establishment of an urban waterway in the location of the historic Lick Run stream which, in addition to conveying separated stormwater runoff, will also serve as a catalyst for community redevelopment. This alternative solution proposes enhancement of natural drainage systems, strategic sewer separation and implementation of green stormwater features throughout the watershed to provide both water quality and volume reduction benefits. The creation of this watercourse will allow clean stormwater flows to be conveyed to Mill Creek rather than being stored in a deep tunnel and treated at the wastewater treatment plant. This alternative addresses the CSO issue while creating a community vision focused on significant

urban revitalization.

The benefits of this sustainable solution extend far beyond just CSO control. Modeling indicates the proposed



*Lick Run Urban Channel Narrow Zone
(Image Source: Human Nature, Inc)*

alternative solution for the Lick Run watershed will keep approximately 1.1 billion gallons of clean stormwater from being conveyed and treated at the wastewater treatment plant each year. The alternative design will also reduce the overflow volume of CSO #5 by approximately 726 million gallons annually, as well as

significant annual energy savings and reduction of CO2 emissions at the Mill Creek WWTP. Water quality benefits for Mill Creek will also be realized as the proposed green stormwater features cleanse the urban stormwater runoff before it is discharged to the creek. In addition, many of the benefits of the sustainable solution cannot easily be quantified, such as the anticipated social and economic revitalization that a new urban waterway will provide to the economically challenged community of South Fairmount. This project also opens the door to other community benefits such as area partnerships that could provide improvements to transportation, housing, and other community features.



Urban Channel Central Civic Space (Image Source: Human Nature, Inc)

Although the details of this Lick Run sustainable solution are

still being evaluated and modified, the sustainable concepts developed by this community-based approach are currently the foundation of MSDGC's vision for the Lick Run CSO solution. The estimated costs for the sustainable alternative are significantly less expense than the estimated costs for the tunnel solution and the auxiliary benefits of the sustainable solution far exceed the basic CSO benefits the tunnel would provide.

As a result, MSDGC's Lick Run project has been receiving a great deal of positive attention and feedback, both in the Midwest and across that nation.



Urban Channel Water Quality Feature *Image Source: Human Nature, Inc*

The Lick Run project is just one example of how this community-based approach to CSO control can provide multiple benefits beyond just the reduction of sewer overflows. By considering a broader range of community issues and looking for multi-faceted solutions, combined sewer overflow projects can become a catalyst for community transformation.

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